

REMARKS/ARGUMENTS

Claims 1-6 and 8-33 have been resubmitted. Claims 1, 4-6, 12-15, 20-21, 24-27 and 29-33 have been amended. Claim 7 has been canceled. New Claims 34-51 have been added.

The Examiner has objected to the specification because of informalities and because it fails to provide proper antecedent basis for the claimed subject matter.

The Examiner has acknowledged that claims 6-24, 28-29 and 33 are directed toward allowable subject matter.

The Examiner has rejected Claim 31 under 35 U.S.C. §112, second paragraph, as being indefinite. The Examiner has also rejected Claims 1-5, 25-27 and 30-32 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,813,835 (Corsmeier), United Kingdom Patent 1,257,041, U.S. Patent No. 5,660,524 (Lee), U.S. Patent No. 4,753,575 (Levengood), U.S. Patent No. 3,902,820 (Amos) and Japanese Patent 6-137,102. Claims 6-12, 28-29 and 33 have been objected to as being dependant on rejected claims.

Specification:

The Examiner objected to the abstract of the specification because it contained the phrases "The inventive" and "The invention comprises". Applicants have submitted an amended specification, deleting the objected to phrases. Withdrawal of the rejection is respectfully requested.

The Examiner also objected to the specification because of informalities, specifically, "a" on page 2, line 7. Applicants could not find the informality that

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was objected to. Further identification of the informality by paragraph number and surrounding text would be appreciated.

Finally, the Examiner has objected to the specification as failing to provide proper antecedent basis for claimed subject matter. Specifically, claim limitation of "at least one" or "at least two" in Claims 1, 4-5, 7, 13, 15, 21, 26, 27 and 29 does not appear in the specification. In an effort to expedite prosecution of this case, Applicants have deleted the limitations of "at least one" and "at least two" from the claims. Applicants therefore request withdrawal of the objection.

35 U.S.C. §112, second paragraph

The Examiner has rejected Claim 31 under 35 U.S.C. §112, second paragraph, as being indefinite. Specifically, the phrase "the step of rensing cooling air after it cools said plenum" is unclear and ambiguous. Applicants have amended claim 31, deleting the word "rensing" and replacing it with "reusing". Basis for the amendment can be found in the specification, particularly on page 10, lines 24 – 28. Applicants submit that amended claim 31, including the phrase "the step of reusing cooling air after it cools said plenum" is definite. Withdrawal of the rejection is respectfully requested.

35 U.S.C. §102(b)

The Examiner has rejected Claims 1-5, 25-27 and 30-32 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,813,835 (Coursmeier), Great Britain Patent 1,257,041, U.S. Patent No. 5,660,524 (Lee), U.S. Patent No. 4,753,575 (Levengood), U.S. Patent No. 3,902,820 (Amos) and Japanese Patent 6-137,102.

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U.S. Patent No. 5,813,835 (Corsmeier)

Claims 1-3, 5, 25-27 and 32 have been rejected under 35 U.S.C. §102(b) as being anticipated by the '835 patent. The '835 patent discloses an air-cooled turbine blade having a plurality of cooling circuits for cooling the pressure side wall and the suction side wall, each circuit having respective individual air inlets.

However, in contrast to the turbine blade of the present invention, the cooling circuits disclosed in the '835 patent do not have a serpentine passage having a plurality of pin fins and a turning vane. Therefore, Applicants have amended independent Claim 1 to include the limitations of Claim 7, namely that the pressure side wall cooling circuit comprises a serpentine passage having a plurality of pin fins and a turning vane. Claim 7 was objected to as containing allowable subject matter that was dependent on rejected independent Claim 1. Independent Claim 25 has been amended to include the limitations of Claims 27 and 28, which were directed toward allowable subject matter. The '835 reference does not teach or suggest providing a center-positioned cooling circuit with thicker walls than the walls of the remaining cooling circuits. Applicants thus submit that the amended claims are not anticipated by the '835 patent and respectfully request withdrawal of the rejection.

United Kingdom Patent 1,257,041.

Claims 1-4 and 25-26 have been rejected under 35 U.S.C. §102(b) as being anticipated by the '041 patent. The '041 patent discloses an air-cooled turbine blade having two independent cooling circuits, one being positioned on the pressure side wall and the other on the suction side wall. The '041 patent does not teach or suggest however, a serpentine passage in the cooling circuit, nonetheless a serpentine passage having a plurality of pin fins and a turning

vane. Nor does the '041 patent teach or suggest a center-positioned cooling circuit with thicker walls than that walls of the other cooling circuits.

In contrast, the blade of the present invention has at least one cooling circuit having a serpentine passage with a plurality of pin fins and a turning vane. The blade also has a center-positioned cooling circuit with thicker walls than the walls of the remaining cooling circuits. Applicants thus submit that the amended claims are not anticipated by the '041 patent and respectfully request withdrawal of the rejection.

U.S. Patent 5,660,524 (Lee).

Claims 25 and 27 have been rejected under 35 U.S.C. §102(b) as being anticipated by the '524 patent. The '524 patent discloses an air-cooled turbine blade comprising having a plurality of cooling circuits having independent inlets at the root of the blade.

In contrast, the present invention claims a method for improving the effectiveness of cooling an air-cooled turbine blade by providing a plurality of cooling circuits, with at least one of the cooling circuits being positioned substantially in the center of the blade interior. This center-positioned cooling circuit has thicker walls than the walls of the remaining cooling circuits. Independent Claim 25 had been amended to include the limitation of positioning one of the cooling circuits substantially in the center of the interior of the blade and providing the center-positioned cooling circuit with thicker walls than the walls of the remaining cooling circuits. The '524 patent does not teach or suggest a cooling circuit positioned substantially in the center of the blade interior wherein the center-positioned cooling circuit has thicker walls than the walls of the other cooling circuits. Applicants thus submit that amended claims

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25 and 27 are not anticipated by the '524 patent and respectfully request withdrawal of the rejection.

U.S. Patent No. 4,753,575 (Levengood).

Claims 25, 27 and 30 have been rejected under 35 U.S.C. §102(b) as being anticipated by the '575 patent. The '575 patent discloses a method for improving cooling in turbine blades in which a plurality of cooling circuits are provided, each cooling circuit having a respective independent air inlet.

However, unlike the method of the present invention, the '575 patent does not provide a cooling circuit positioned substantially in the center of the blade interior wherein the center-positioned cooling circuit has thicker walls than the walls of the other cooling circuits. Applicants thus submit that amended claims 25, 27 and 30 are not anticipated by the '575 patent and respectfully request withdrawal of the rejection.

U.S. Patent 3,902,820 (Amos).

Claims 25 and 27 have been rejected under 35 U.S.C. §102(b) as being anticipated by the '820 patent. The '820 patent discloses a method of improving the cooling of an air-cooled turbine blade by providing a plurality of cooling circuits having independent air inlets.

In contrast, the present invention claims a method for improving the cooling effectiveness of a turbine blade in which a plurality of cooling circuits are provided, wherein at least one circuit is positioned substantially in the center of the blade interior wherein the center-positioned cooling circuit has thicker walls than the walls of the other cooling circuits. The '820 patent does not teach or suggest such a cooling circuit. Applicants thus submit that amended claims 25

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and 27 are not anticipated by the '820 patent and respectfully request withdrawal of the rejection.

Japanese Patent 6-137102.

Claims 25, 27 and 30 have been rejected under 35 U.S.C. §102(b) as being anticipated by JP 6-137102. The air-cooled blade disclosed in JP 6-137102 has a plurality of cooling circuits with independent air inlets. The blade is cooled by injecting air into the inlets and passing it through the cooling circuits. The cooling circuits are positioned radially in the center of the airfoil between the hub and the tip of the blade.

In contrast, the present invention provides a cooling circuit positioned substantially in the center to the blade interior between the pressure and suction sides of the airfoil. Moreover, the center-positioned cooling circuit has thicker walls than the walls of the other cooling circuits in the blade. Applicants thus submit that amended claims 25, 27 and 30 are not anticipated by JP 6-137,102 and respectfully request withdrawal of the rejection.

New Claims.

New claims 34-51 have been added to the present application. Applicants submit that the new claims contain no new subject matter. Claim 34 is objected-to dependent Claim 6 rewritten as an independent claim, including all the limitation of original Claim 1 and intervening Claim 5. The Examiner indicated that Claim 6 would be allowed if rewritten in independent form including all of the limitations independent Claim 1 and intervening Claim 5. Allowance of Claims 34-43 is thus respectfully requested.

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New Claim 44 is directed toward a method for improving the cooling effectiveness of an air-cooled turbine blade comprising the steps of providing a plurality of independent cooling circuits within the interior of the blade, wherein one of the cooling circuits has a serpentine passage with a plurality of pins and a turning vane, and injection of cooling air into each cooling circuit through respective independent air inlets. None of the prior art references cited by the Examiner teach or suggest a cooling circuit having a serpentine passage with a plurality of pins and a turning vane. This is further supported by the objection to Claim 7 as a dependent claim with allowable subject matter but dependent on a rejected claim. The limitation of a serpentine passage having a plurality of pin fins and a turning vane is the same limitation as claim 7. Applicants therefore respectfully request the allowance of Claim 44 and the subsequent dependent claims, Claims 45-51.

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CONCLUSION

Reconsideration and withdrawal of the Office Action with respect to Claims 1-5, 25-27 and 30-32 is requested. Allowance of new claims 44-51 is also respectfully requested.

In the event the examiner wishes to discuss any aspect of this response, please contact the attorney at the telephone number identified below.

Respectfully submitted,

By:



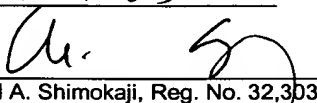
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